

Clean Coal Power Initiative



*CCPI Draft Solicitation
Meeting*

January 17, 2002

Rita A. Bajura, Director

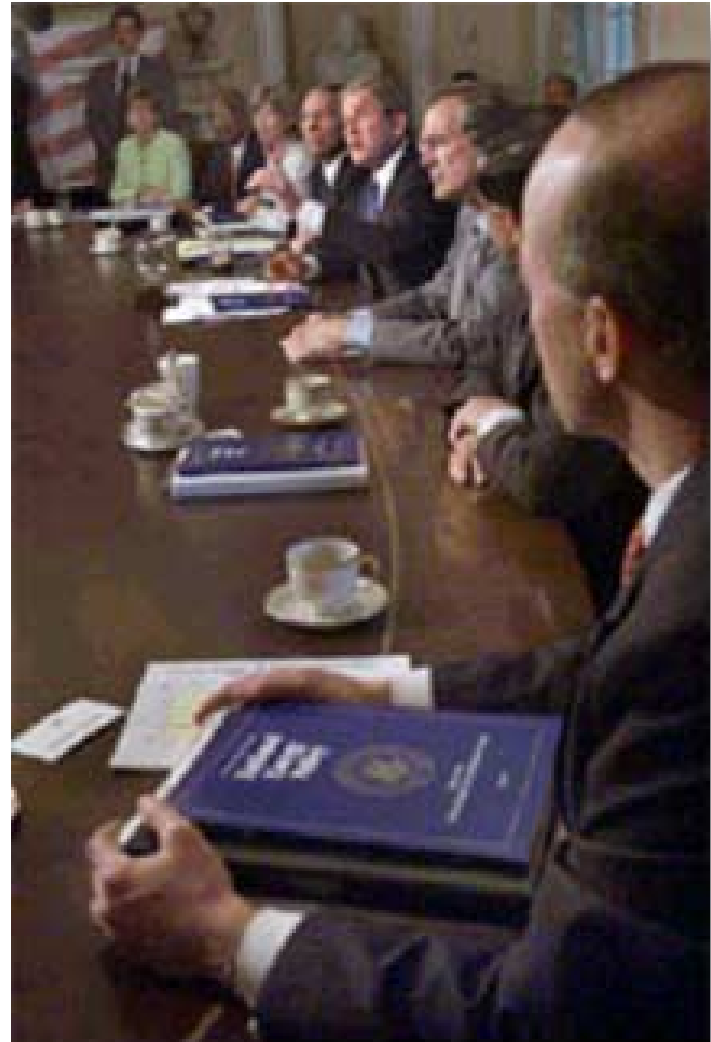
National Energy Technology Laboratory



www.netl.doe.gov

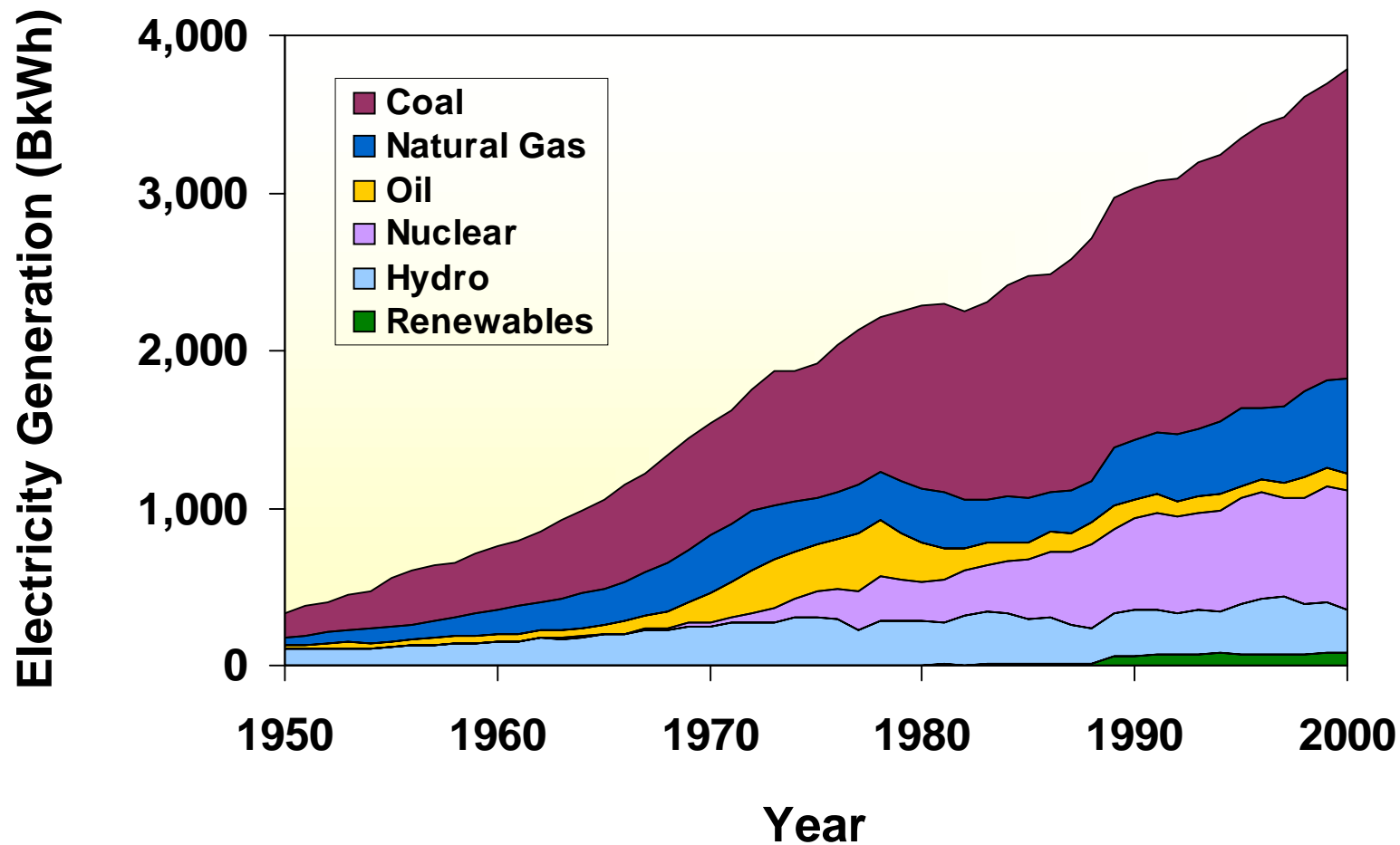


*Clean electricity from
coal is key component of
National Energy Policy*

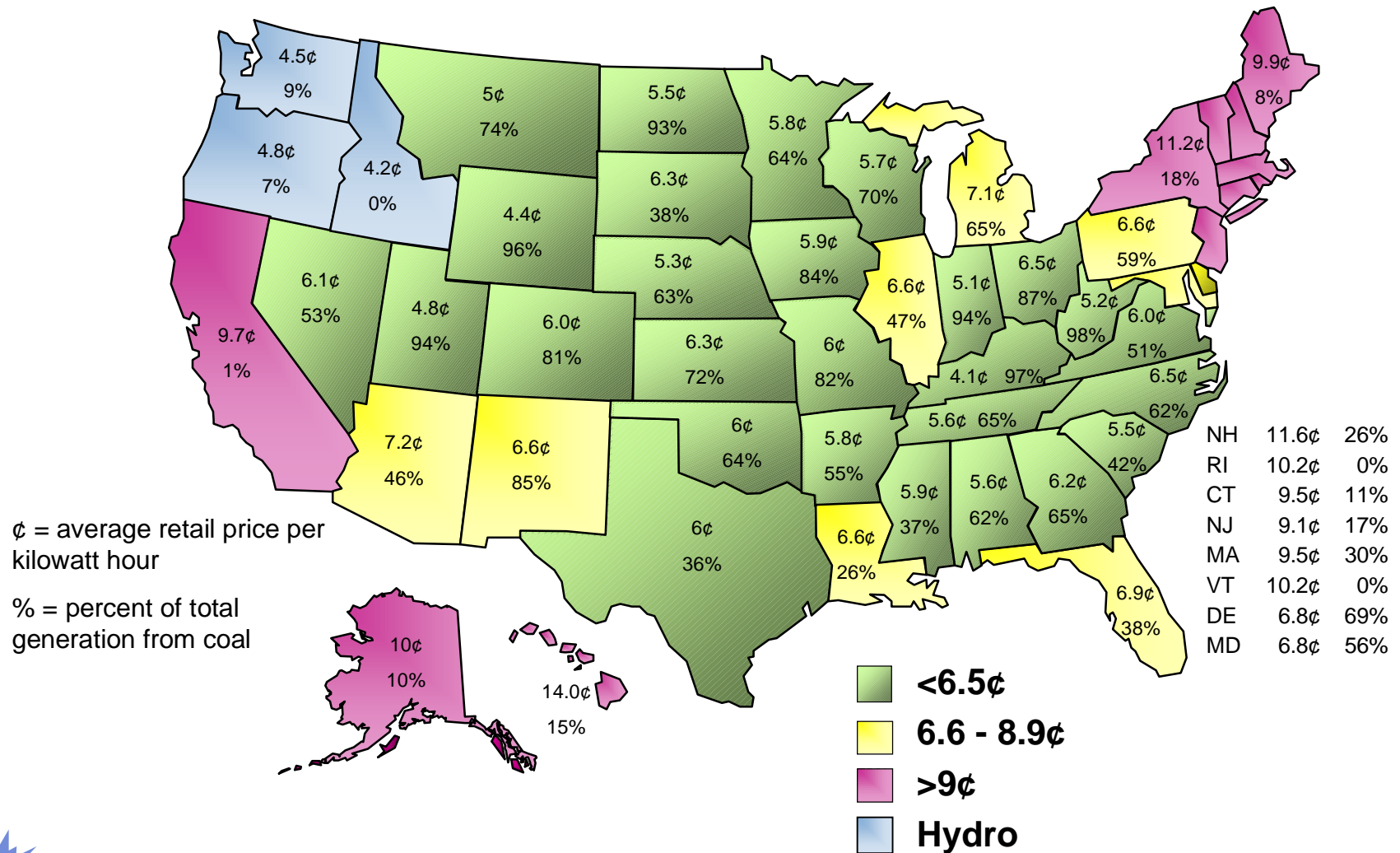


Coal Provides 52% of Electric Supply

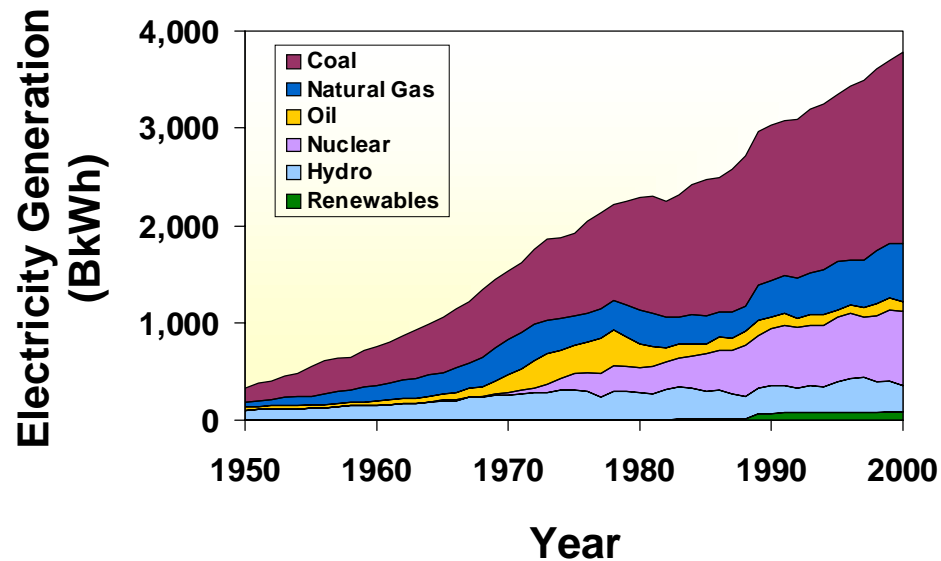
U.S. Power Generation



Coal Use Translates to Secure, Reliable, Affordable Electricity



Today → Future



U.S. Power Generation

→

Competitive marketplace providing sustainable, secure, affordable energy resources

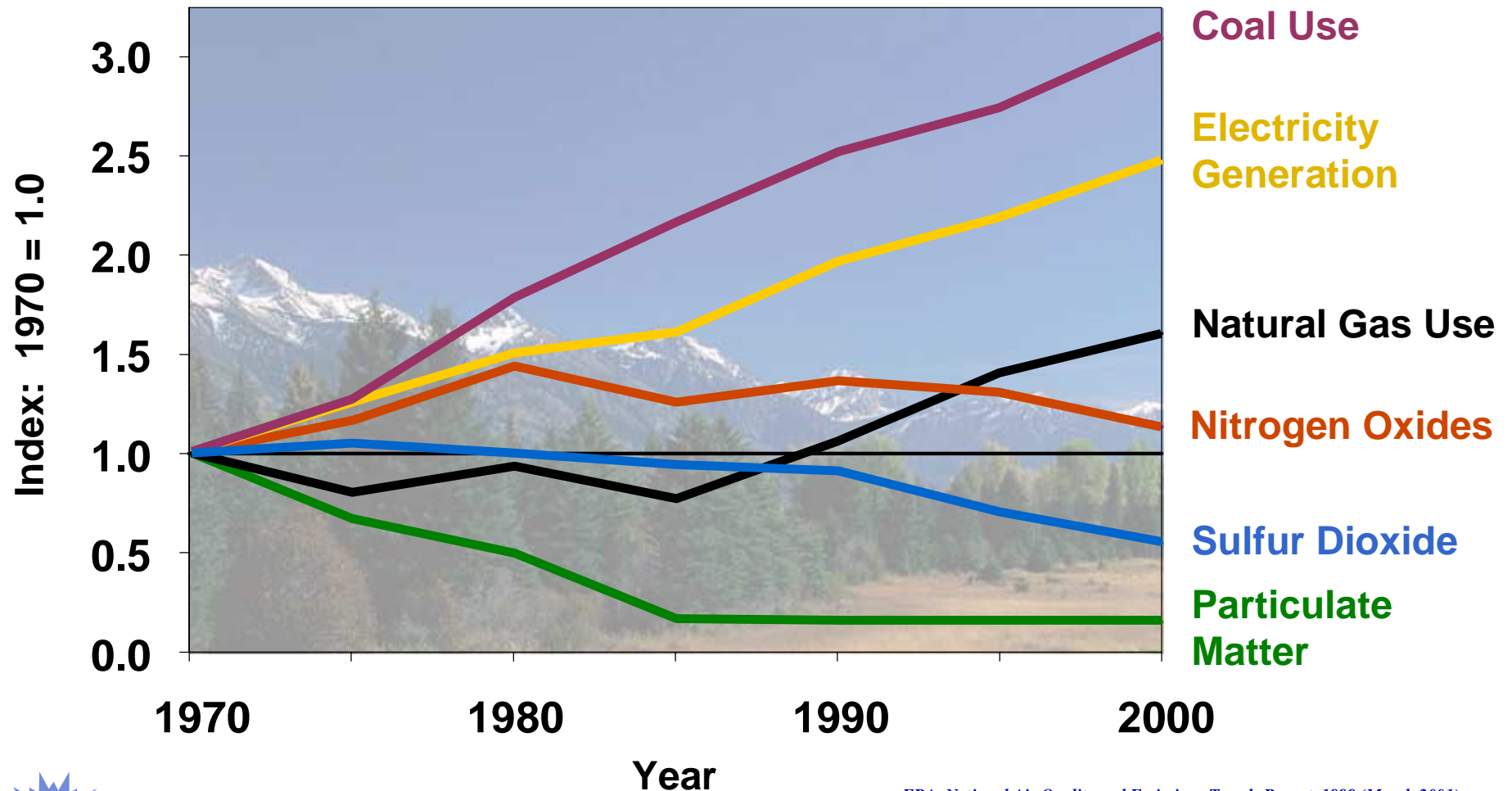
Impetus for Federal Investment in Coal

- **Environmental emissions**
- **Climate change**
- **Energy security**



Progress in Meeting Environmental Goals

Proposed Legislation Will Further Reduce Emission Limits



EPA, National Air Quality and Emissions Trends Report, 1999 (March 2001)
DOE, EIA Annual Energy Review

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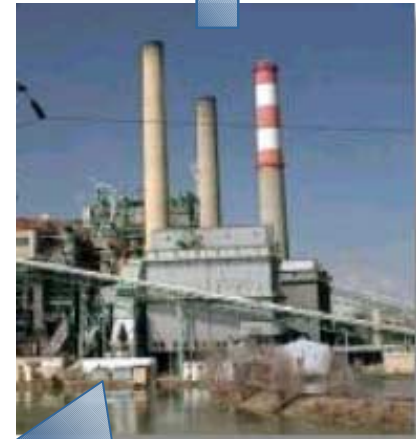
Mercury

- Utilities release 41 tons/yr
- Proposed cap of 7.5 tons/yr
- Issues
 - Cost
 - Timing
 - Uncertainty

*U.S. Mercury Emissions for
Coal-Fired Power Plants*
*1998 Mercury Emissions
Inventory*



Stack Emissions
41 tons/yr



Hg in Coal
75 tons/yr

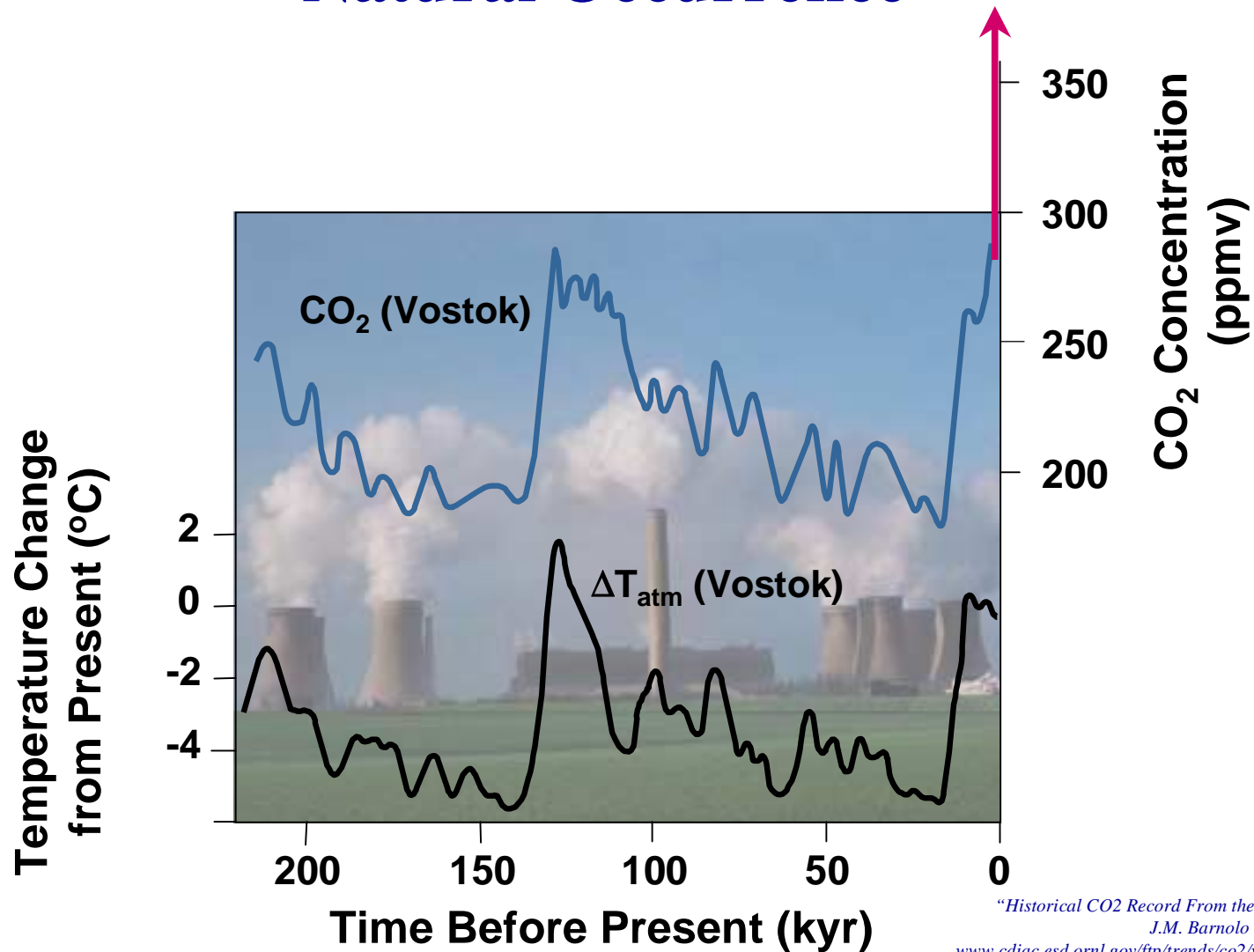


Impetus for Federal Investment in Coal

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CO₂ Concentrations Beyond Range of Natural Occurrence



"Historical CO₂ Record From the Vostok Ice Core"

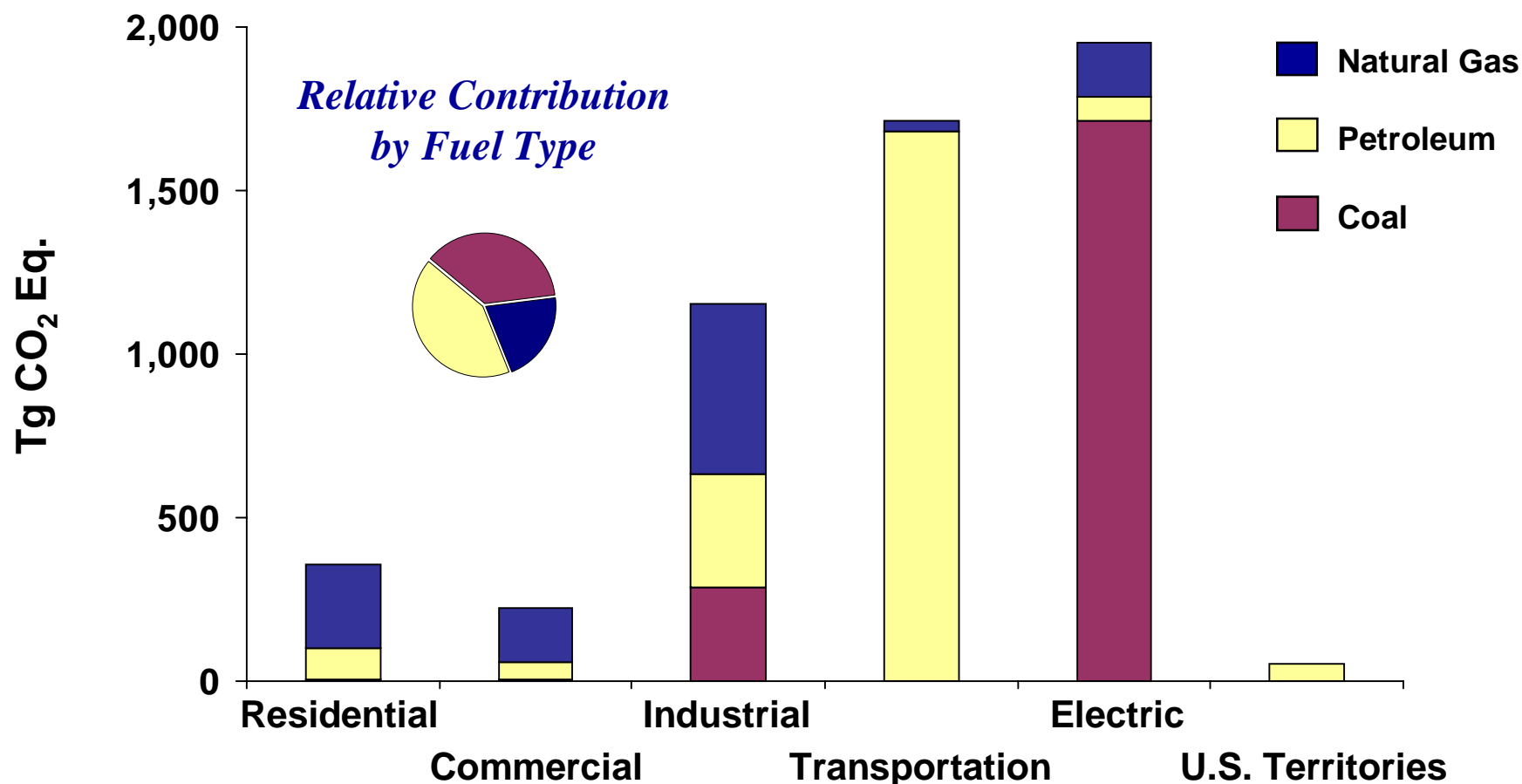
J.M. Barnolo et al, August 1999

www.cdiac.esd.ornl.gov/fjp/trends/co2/vostok.icecore.co2



1999 CO₂ Emissions from Fossil Fuel Combustion

Sector and Fuel Type



Note: Electric utilities also includes emissions of 0.04 Tg CO₂ Eq. from geothermal-based electricity generation

Table 2-3, EPA 236-R-01-001, April 2001
Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-1999

Need All Technological Carbon Management Options

**Reduce
Demand**

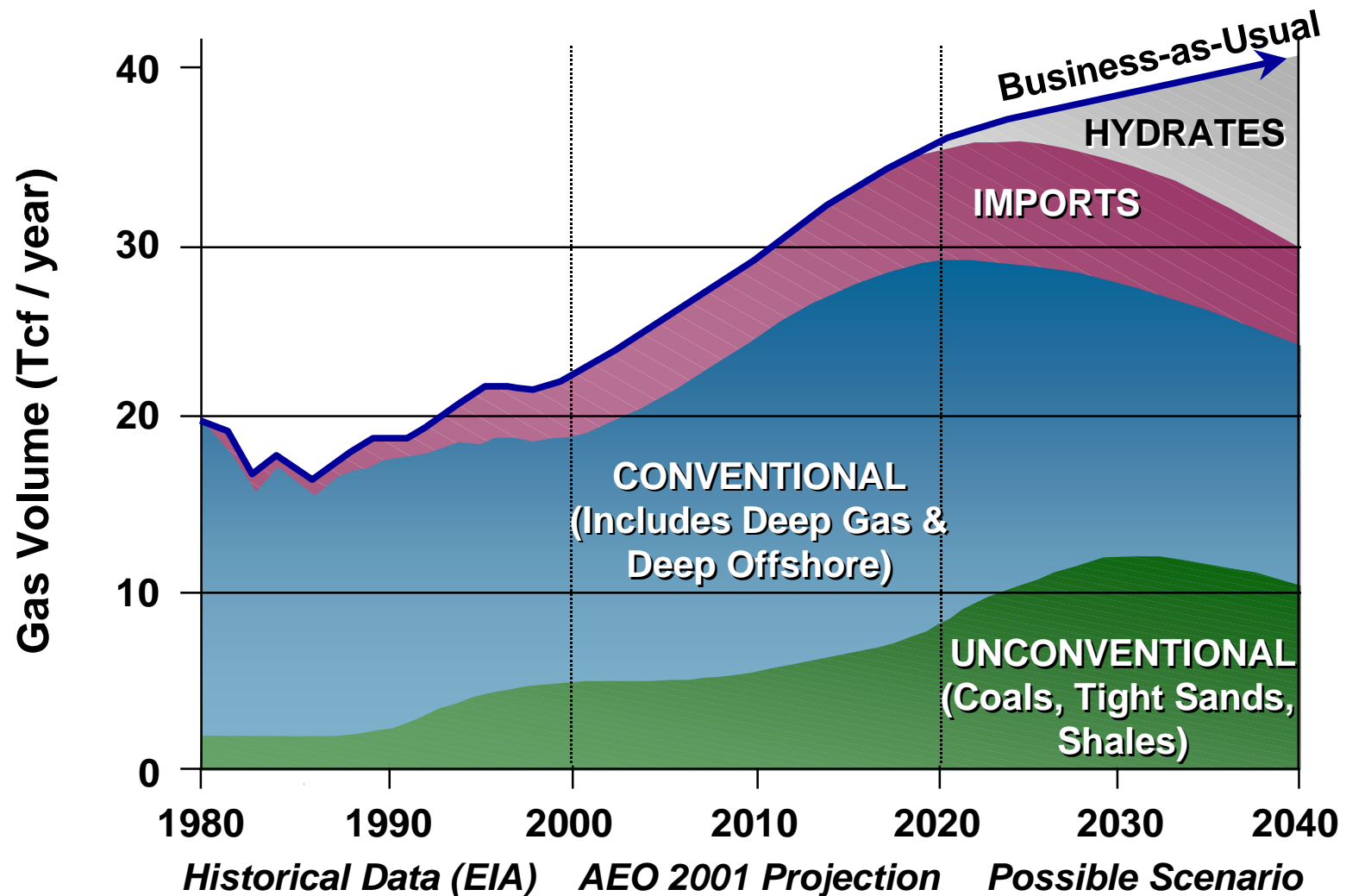
**Reduce Carbon
Intensity
of Fuels**

**Improve
Efficiency of
Production and
Distribution**

**Sequester
Carbon**



Enough Affordable Gas to Meet Demand?



Impetus for Federal Investment in Coal

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Energy Security

Confidence that acceptable forms of energy will be available

- **In sufficient quantities**
- **At affordable prices**
- **When needed**



Threats to Energy Security

Increased

- Terrorist threats
- Oil and gas imports
- Aging infrastructure
- Less reserve capacity
- Interdependencies



World Trade Center

Photo Courtesy of IUOE

Increasing Energy Security



- Domestic oil & gas production
- Fuel diversity
- Renewable energy
- Fuel stockpiles
- More efficient vehicles
- Mass transit
- Conservation
- Urban planning
- Distributed generation
- Redundant systems
- Increased surveillance
- Self healing energy networks
- Emergency response
- Consequence management



Hydrogen Production

Today



Steam Reforming Methane



**Coal Gasification/
Sequestration**



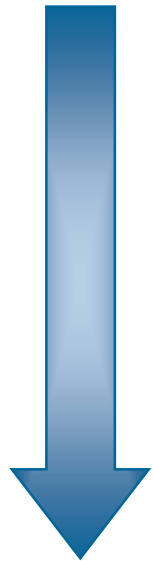
Renewables



**Chemical Industry
and Refineries**



FreedomCAR



Future

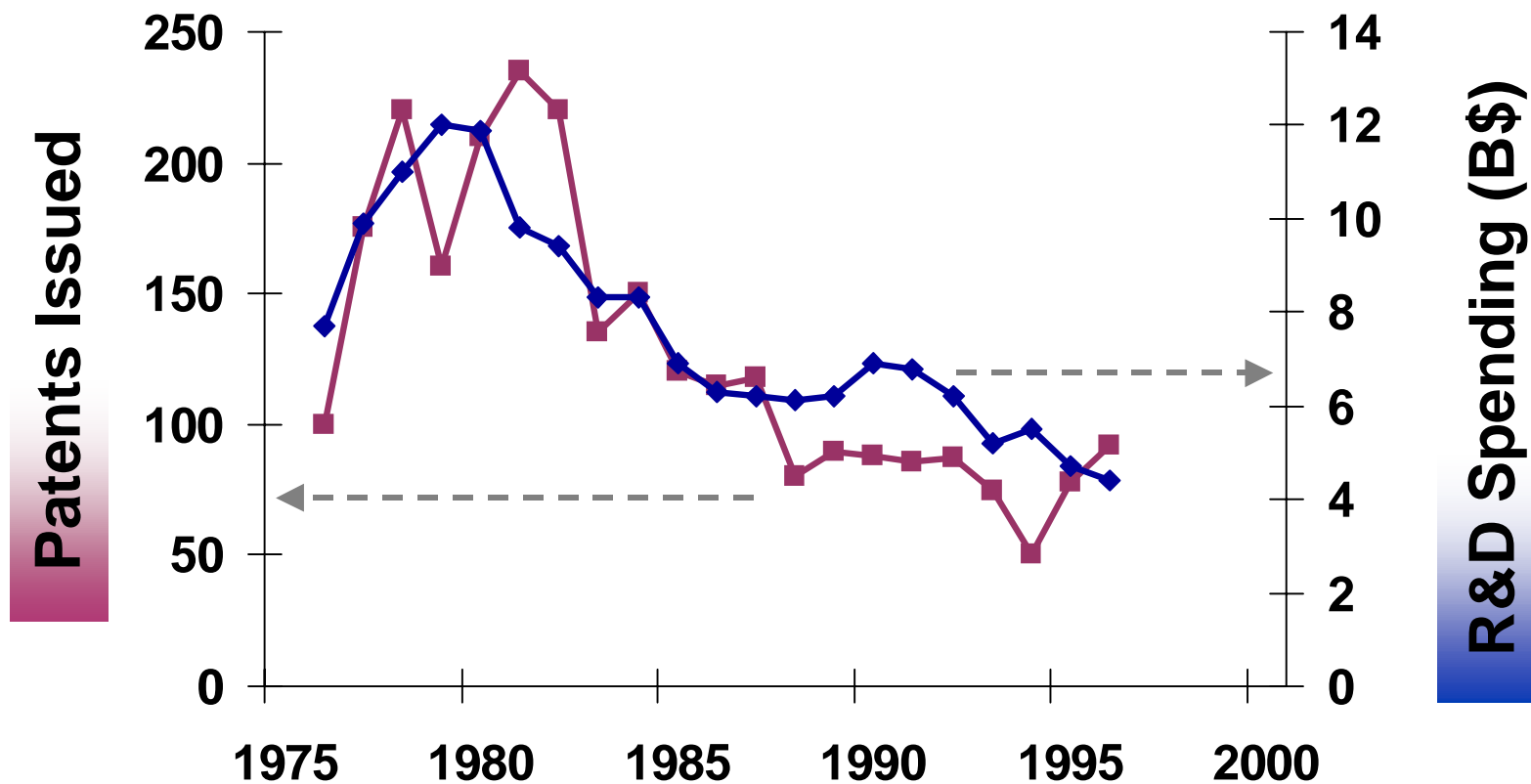


Traffic photo: Warren Gretz, NREL

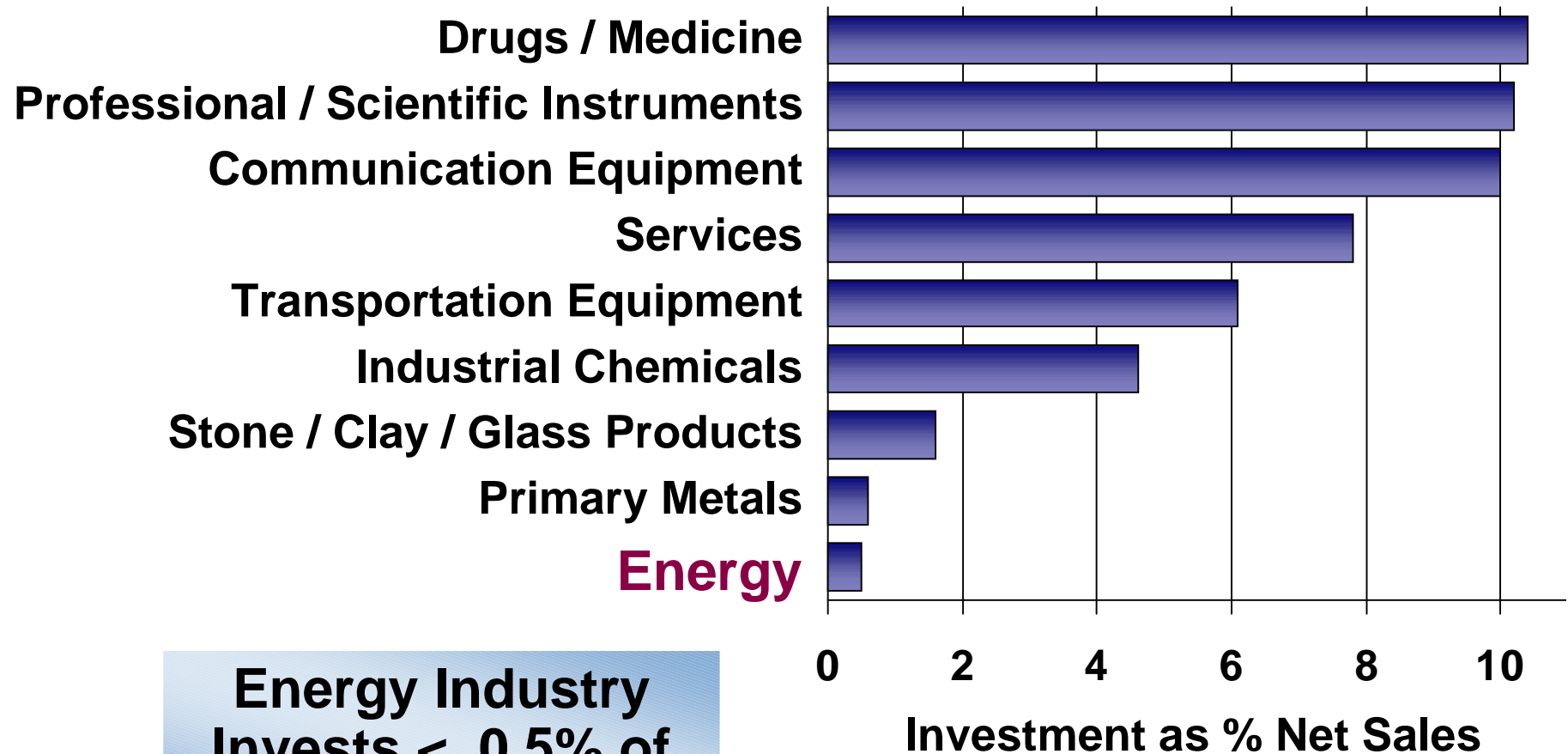
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Energy Related R&D Investment Declining

Investment at 23-year Low



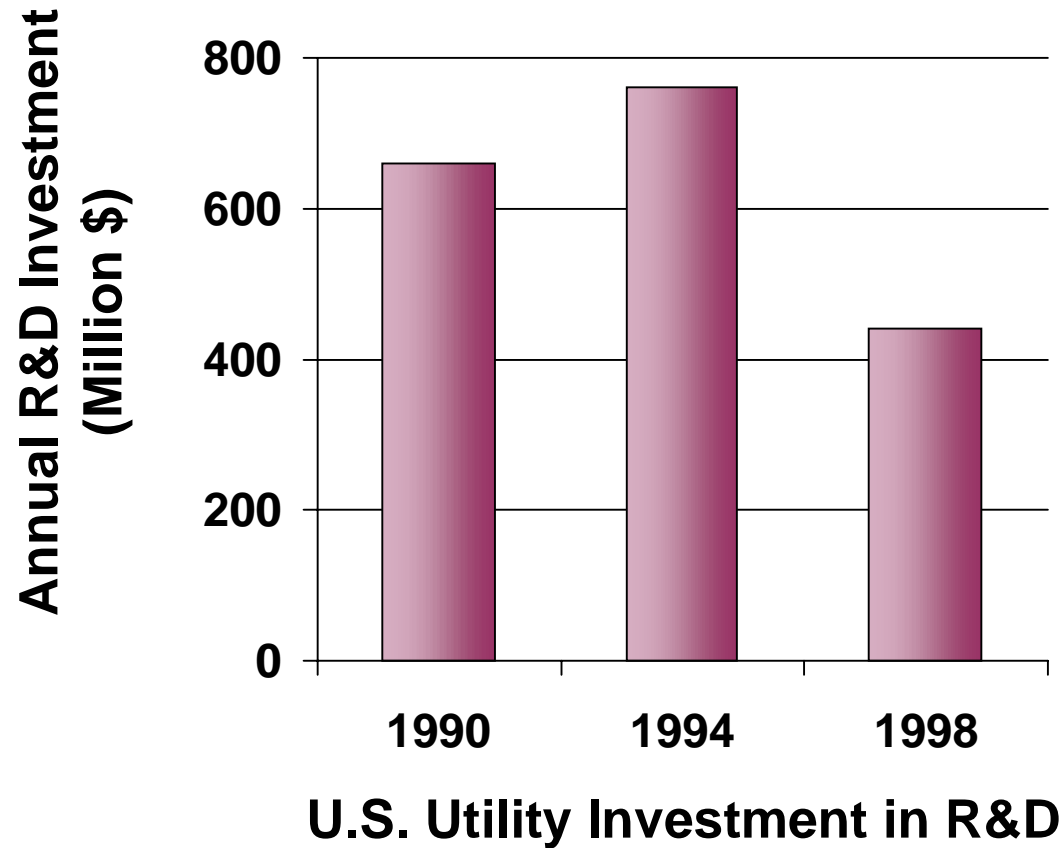
Energy Sector R&D Investments Low



**Energy Industry
Invests < 0.5% of
Sales**



Downward Investment Trend By Utilities



Drivers for Downward Trend

- Uncertainty
- Increased competition

CCPI Helps Nation Address Major Energy Issues



**Energy Security Link
to National Security**



Electric Reliability

**Climate Change &
CO₂ Sequestration**



**Emissions from
Current Fleet**



**Hydrogen for
FreedomCAR**



Traffic photo: Warren Gretz, NREL

